YK Dist.

CALVING GROUND FIDELITY OF THE BLUENOSE CARIBOU HERD, 1986-1988

BRUCE MCLEAN

AND

PAUL FRASER

DEPARTMENT OF RENEWABLE RESOURCES

GOVERNMENT OF THE NORTHWEST TERRITORIES

INUVIK, NWT

1992

RECEIVED

FEB 26 1993

GOV'T OF THE N.W.T
RENEWABLE RESOURCES
YELLOWKNIFE DISTRICT

Northwest Territories Renewable Resources

File Report No. 105

CALVING GROUND FIDELITY
OF THE
BLUENOSE CARIBOU HERD, 1986-1988

BRUCE MCLEAN

AND

PAUL FRASER

DEPARTMENT OF RENEWABLE RESOURCES

GOVERNMENT OF THE NORTHWEST TERRITORIES

INUVIK, NWT

1992

Northwest Territories Renewable Resources

File Report No. 105

ABSTRACT

The traditional calving ground of the Bluenose caribou herd is northwest of Bluenose Lake in an area encompassed by the Roscoe, Brock and Hornaday rivers. To assess fidelity to traditional calving grounds, 46 radio-collared female caribou were relocated during the calving period in three successive years, 1986 to 1988. Annual locations of individual caribou were plotted on a 1:250,000 topographical map and distances between locations in successive years were measured. Over the 3 year sampling period, the majority of collared females were located in the central part of the calving ground. Thirty percent were located between the Horton and Hornaday rivers, 39% were between the Hornaday and Brock rivers, and 20% between the Brock and Roscoe rivers. The remaining 11% were located to the west on the Bathurst peninsula or to the south. Two females were never found on the calving ground while 9 females were not relocated in 1 of 3 years. The average distance moved between annual locations was 43.6 $\pm$ 30.8 km. Locations of 4 females differed by 90 km or more from their locations during previous calving ground surveys and they were considered to be unfaithful to their previous locations. Annual variation exists in specific locality and concentrations within the calving grounds and are thought to be the result of various factors (i.e., snow cover, the presence or absence of predators).

103-05928/

TABLE OF CONTENTS

ABSTRACT iii

LIST OF FIGURES vii

LIST OF TABLES ix

INTRODUCTION 1

STUDY AREA 2

METHODS 4

RESULTS 9
1986 Survey 9
1987 Survey 11
1988 Survey 14

DISCUSSION AND CONCLUSION 17

RECOMMENDATION 19

ACKNOWLEDGEMENTS 20

LITERATURE CITED 21

LIST OF FIGURES

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT 3

Figure 2. Transect lines flown 7-9 June 1986 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT 5

Figure 3. Transect lines flown 7-9 June 1986 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT 6

Figure 4. Transect lines flown 9-12 June 1988 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT 7

Figure 5. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT, 7-9 June 1986 10

Figure 6. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT, 6-8 June 1987 12

Figure 7. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT, 9-12 June 1988 16

LIST OF TABLES

Table 1. Distances between locations of radio-collared female Bluenose caribou located in successive years on their calving grounds near Paulatuk, NWT 13

INTRODUCTION

Within the Northwest Territories, four major mainland herds of Barren-ground caribou (Rangifer tarandus groenlandicus) have been identified. Each herd has been defined as a distinct group of animals which calve in a traditional area separate from the calving areas of other herds (Thomas 1969). Fidelity (returning every year) to a discrete calving area is the generally accepted criterion for assigning herd status and has been previously documented in herds in Alaska and Labrador (Skoog 1968, Cameron et al. 1986, Brown and Theberge 1985). Earlier NWT studies have shown that breeding females and females with calves concentrate in the high, rugged terrain northwest of Bluenose Lake (Hawley et al. 1976, Carruthers and Jakimchuk 1981, Brackett et al. 1982, Latour and Heard 1985, Latour et al. 1986).

Females are considered to be unfaithful to the calving ground if:

(1) they are never located on the calving ground or are missing during one of the survey years, or

(2) the location on the calving ground differed by 90 km between years (Heard and Stenhouse 1988).

Our objectives in this study were to:

(1) monitor radio collared females in 1986, 1987 and 1988 to determine locations on the calving ground, and

(2) compare yearly variation in location (i.e., fidelity).

STUDY AREA

The study area lies within the Horton Plain physiographic region typified by rolling, rocky till plain generally less than 100 m in elevation (Zoltai et al. 1979). Lakes and ponds are numerous in the west but few occur in the central portion. The major drainage systems include the Anderson, Horton, Hornaday, Brock and Roscoe rivers (Figure 1). Prominent uplands (max. elevation 900 m) occur in the northeast and the northwestern part of the study area (Zoltai et al. 1979). Deeply incised canyons, varying in length (16-50 km) and depth (60-120 m) occur on the Brock and Hornaday rivers. The area to the north and east of the Horton River is above the treeline and the vegetation consists primarily of sparsely vegetated lichen tundra, open shrubland and sedge tundra in the wet, low-lying areas (Jacobson 1979, Ferguson 1987).

In 1986 and 1987, the study area was bounded by the Anderson River on the west, the Arctic Ocean to the north, Bluenose Lake in the east and 68 degrees north latitude in the south. In 1988, the study area was expanded slightly east of Bluenose Lake to locate animals collared at Dismal Lakes in March 1988.

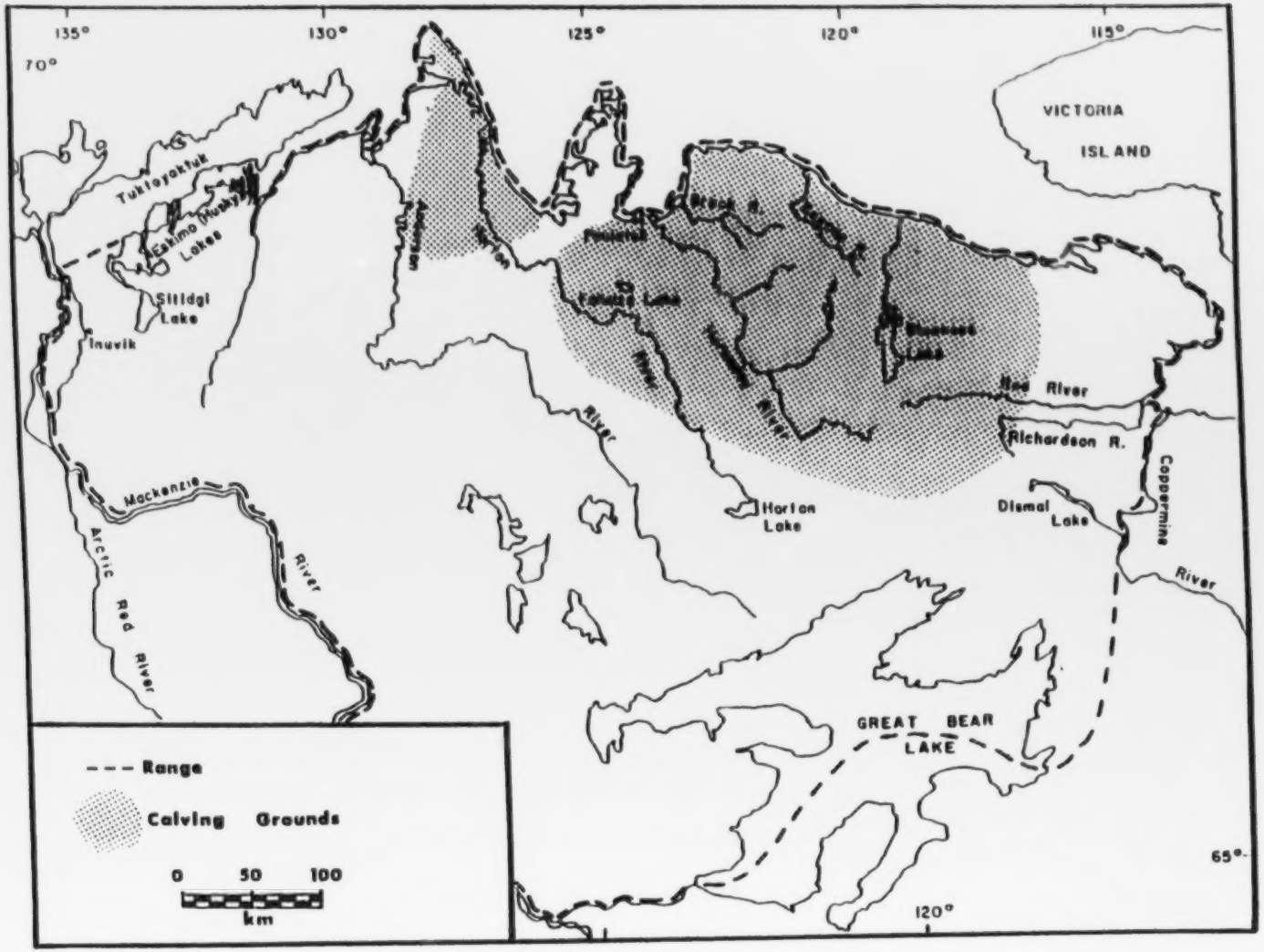

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT.

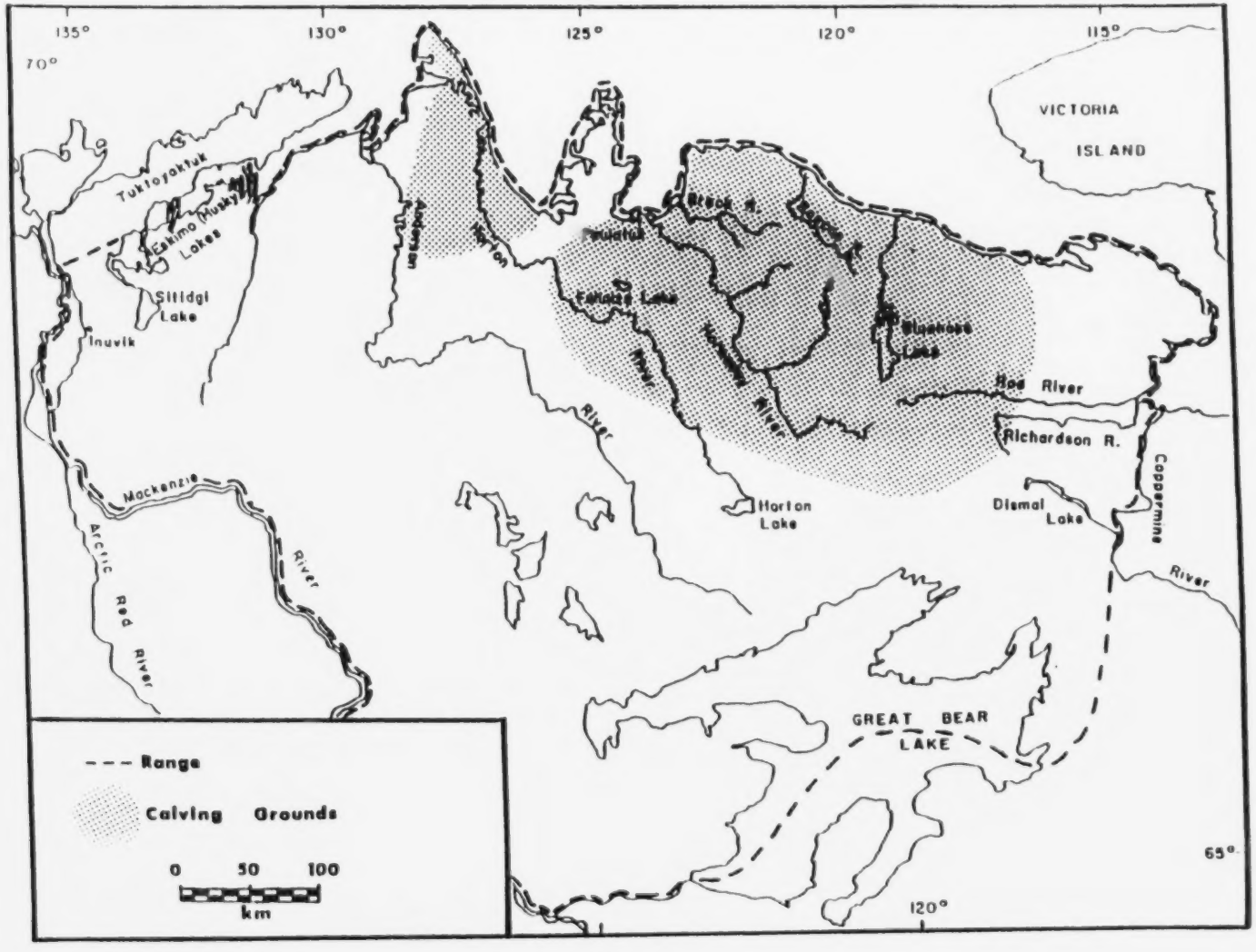

Figure 1. Range and general calving area of the Bluenose caribou herd in the NWT.

METHODS

Forty-seven female caribou (31 adults, 16 yearlings) were radio-collared between November 1985 and March 1988. A number was assigned to each animal and a visual marker rivetted to the collar. Thirty-four animals were outfitted with Telonics model 600 radio-collars with mortality sensors (S6A, Telonics Corp. Ltd., Mesa, Az), the remaining 13 with collars from AVM (AVM Industries, Rawlins, CO).

A Cessna 185, equipped with a scanner/receiver (Model TS-1, Telonics Corp. Ltd., Mesa, Az) and 2 dual element antennae (Model RA-2AK, Telonics Corp. Ltd., Mesa, Az), was used to relocate collared caribou. Radiocollars were monitored audibly by flying at altitude 2155-2460 m above ground level (agl) and an airspeed of 190 kph (Figures 2,3,4). As time and weather permitted, female caribou were relocated by low level flying (155-310 m agl). If collared cows were in a small enough group, attempts were made to visually locate the collared animals and determine whether or not they had a calf.

Accurate locations were those locations where the signal was determined to be coming from a specific group of caribou observed by low level flying (155-310 m agl) but no visual of the collared animal was obtained. Visual locations occurred when the collared animal was observed. Accurate and visual radio locations were plotted on a 1:250,000 scale topographical map and distances between locations in successive years were measured.

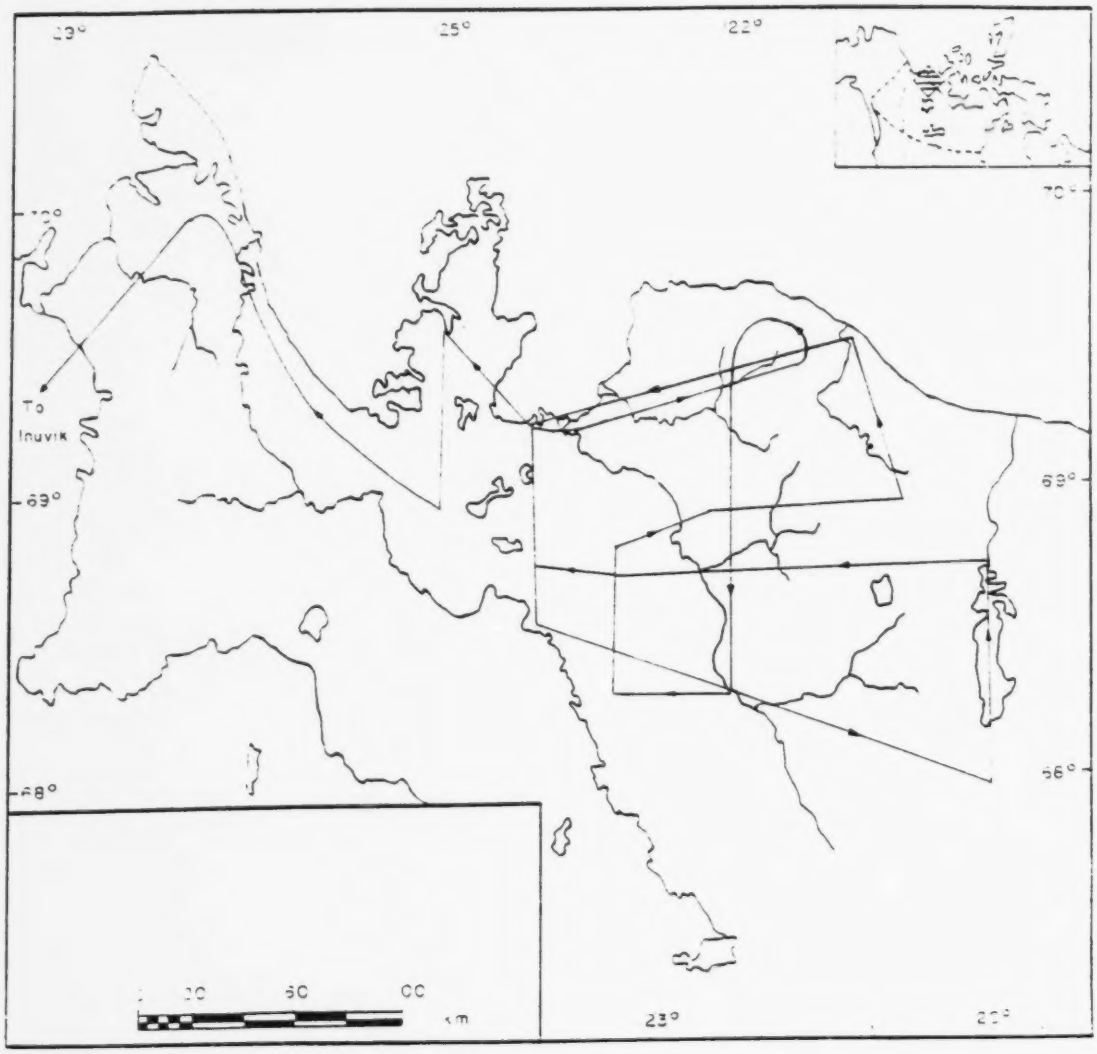

Figure 2. Transect lines flown 7-9 June 1986 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT.

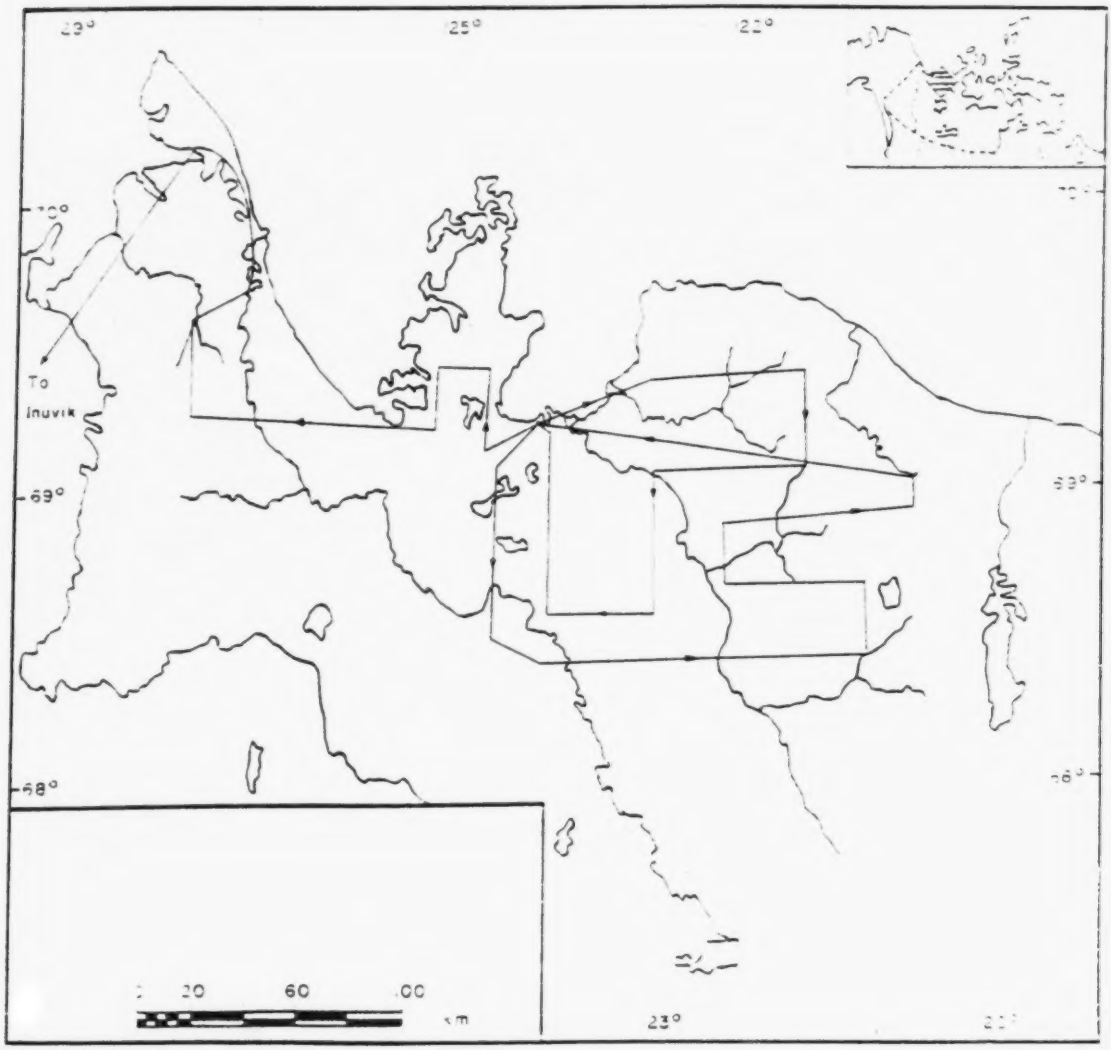

Figure 3. Transect lines flown 6-8 June 1987 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT.

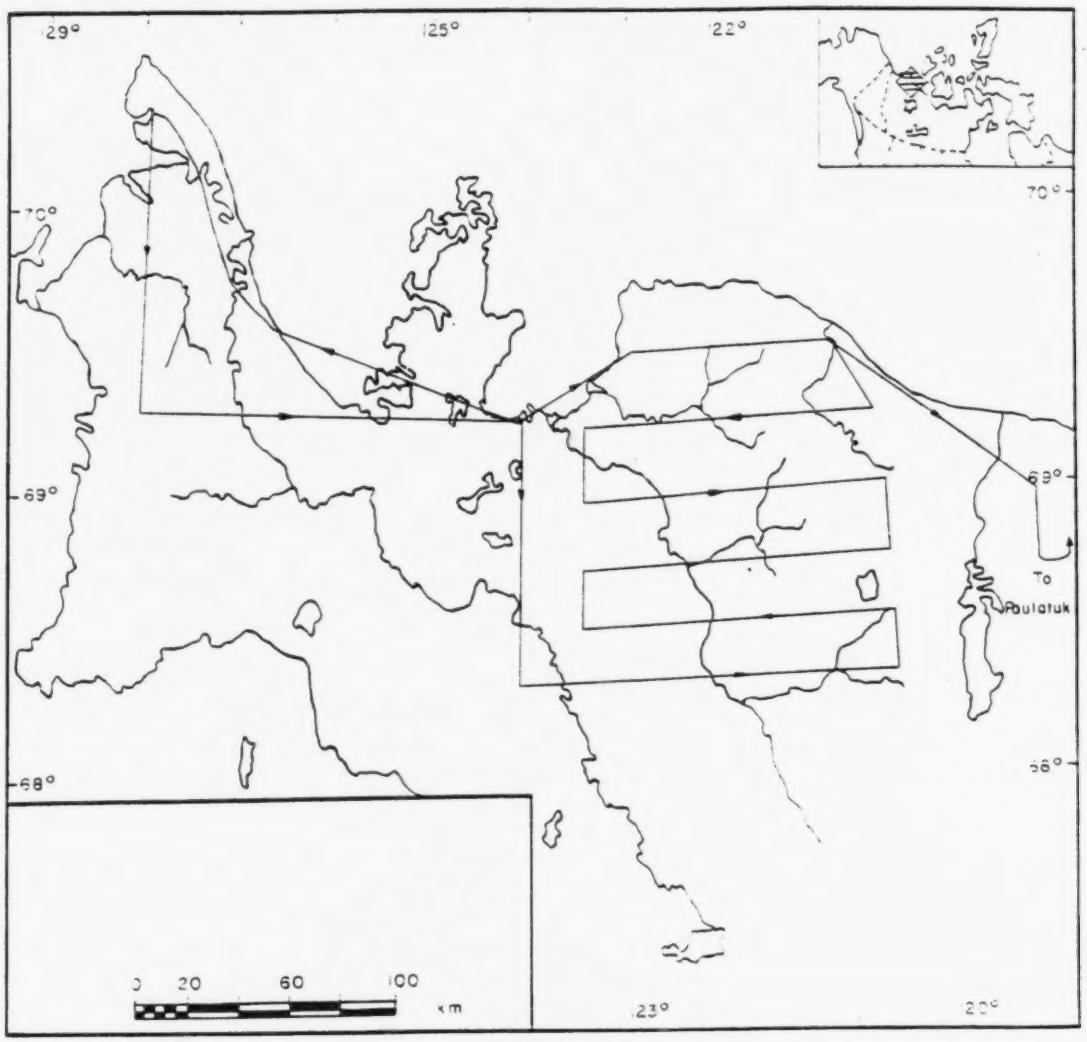

Figure 4. Transect lines flown 9-12 June 1988 during the Bluenose caribou calving ground fidelity survey near Paulatuk, NWT.

In 1986 ground fog made it difficult to map locations of animals accurately. Therefore, in 1987 and 1988, the aircraft was equipped with a Global Navigation System.

RESULTS

1986 Survey

Thirty-four collars (29 adult females collared in November 1985, 5 females collared as yearlings in March 1986) were available for tracking.

The survey was completed in 3 days (June 7-9) and 17 hours of flying time expended were from departure until return to Inuvik. Spring was late as there was approximately 50-70% snow cover. All the major lakes were ice-covered while rivers were ice-free. All 34 collars were heard. Of these, accurate locations were obtained for 18 of 29 adult females. Ground fog and large group sizes made it difficult to locate visually collared animals on the calving ground. Visual locations were obtained for 2 adult and 1 yearling female.

Distribution on the Calving Ground

Twenty-five percent of the 20 adult females were located between the Horton and Hornaday rivers, 50% of the adult females and the one yearling female were between the Hornaday and Brock rivers, and 20% of the adult females were found between the Brock and Roscoe rivers. One adult female, the remaining 5% was located outside the main calving area below the Hornaday River (Figure 5).

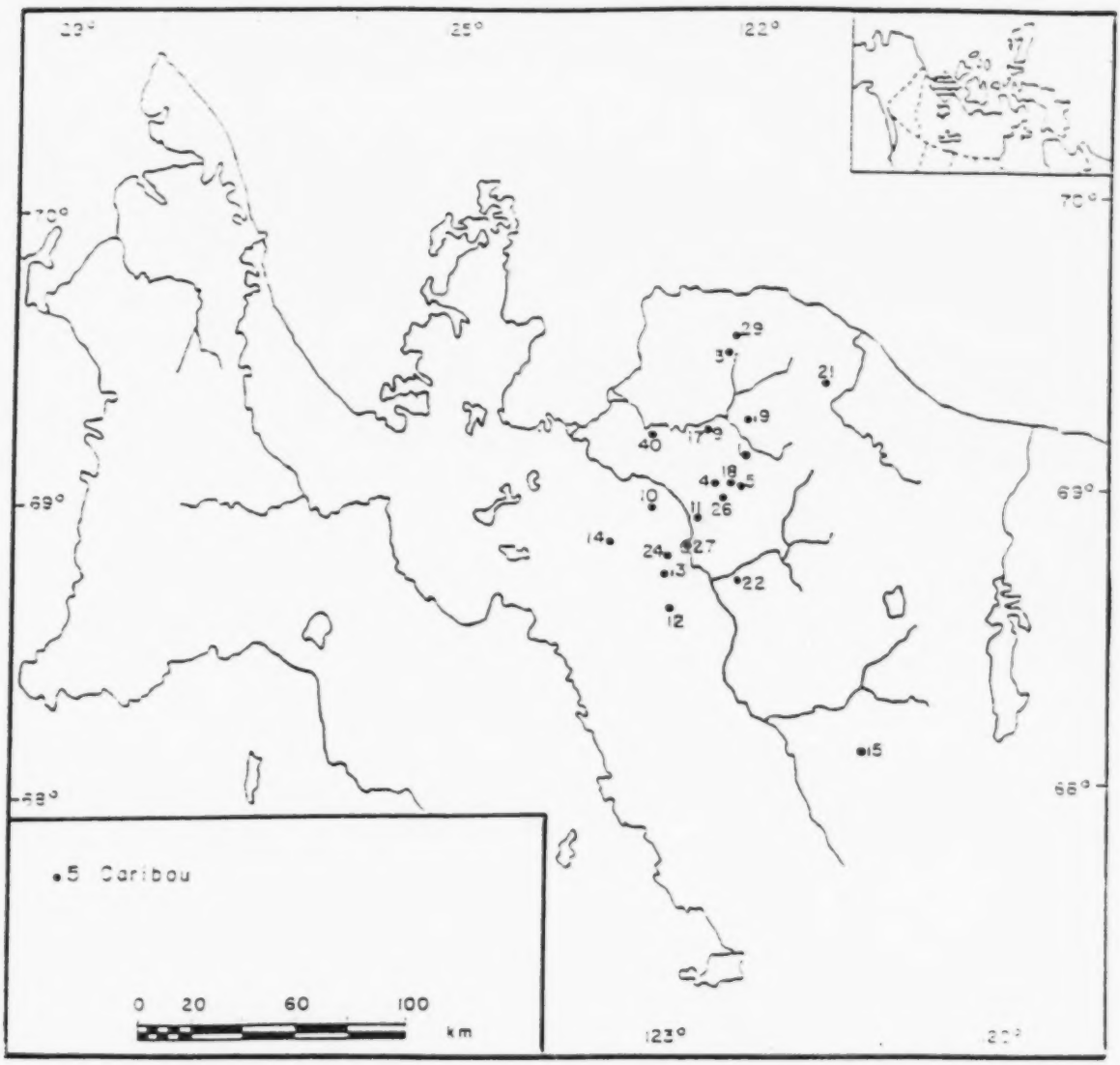

Figure 5. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT , 7-9 June 1986.

1987 Survey

Forty-four collars (28 collared in 1985, 5 in 1986, 11 collared in March 1987) were available for tracking.

The survey was completed in 3 days (June 6-8) and 19.1 hours of flying time expended were from departure until return to Inuvik. Conditions were similar to 1986 with approximately 50% snow cover, lakes were ice-covered while rivers were ice-free. Seventy-nine percent (35/44) of the available collars were heard; accurate locations were obtained for 6 adult females and visual locations for 16 adult and 2 yearling females. Animals not found included 5 females that were present on the calving ground in 1986 and 4 females collared as yearlings in February 1987.

Distribution on the Calving Ground

Forty-one percent of the 22 adult females and the two yearlings were located between the Horton and Hornaday rivers, 27% were between the Brock and Hornaday rivers, while 27% were found between the Roscoe and Brock rivers. The remaining 5% were located outside the main calving area below the Hornaday River (Figure 6).

Fifteen females accurately or visually located in 1986 were accurately or visually relocated in 1987 allowing for a comparison of distance between locations in successive years. The average distance was 39.8 $\pm$ 21.7 km (range: 11.5-95.0 km; Table 1). Heard and Stenhouse (1988) considered a cow to be unfaithful to its

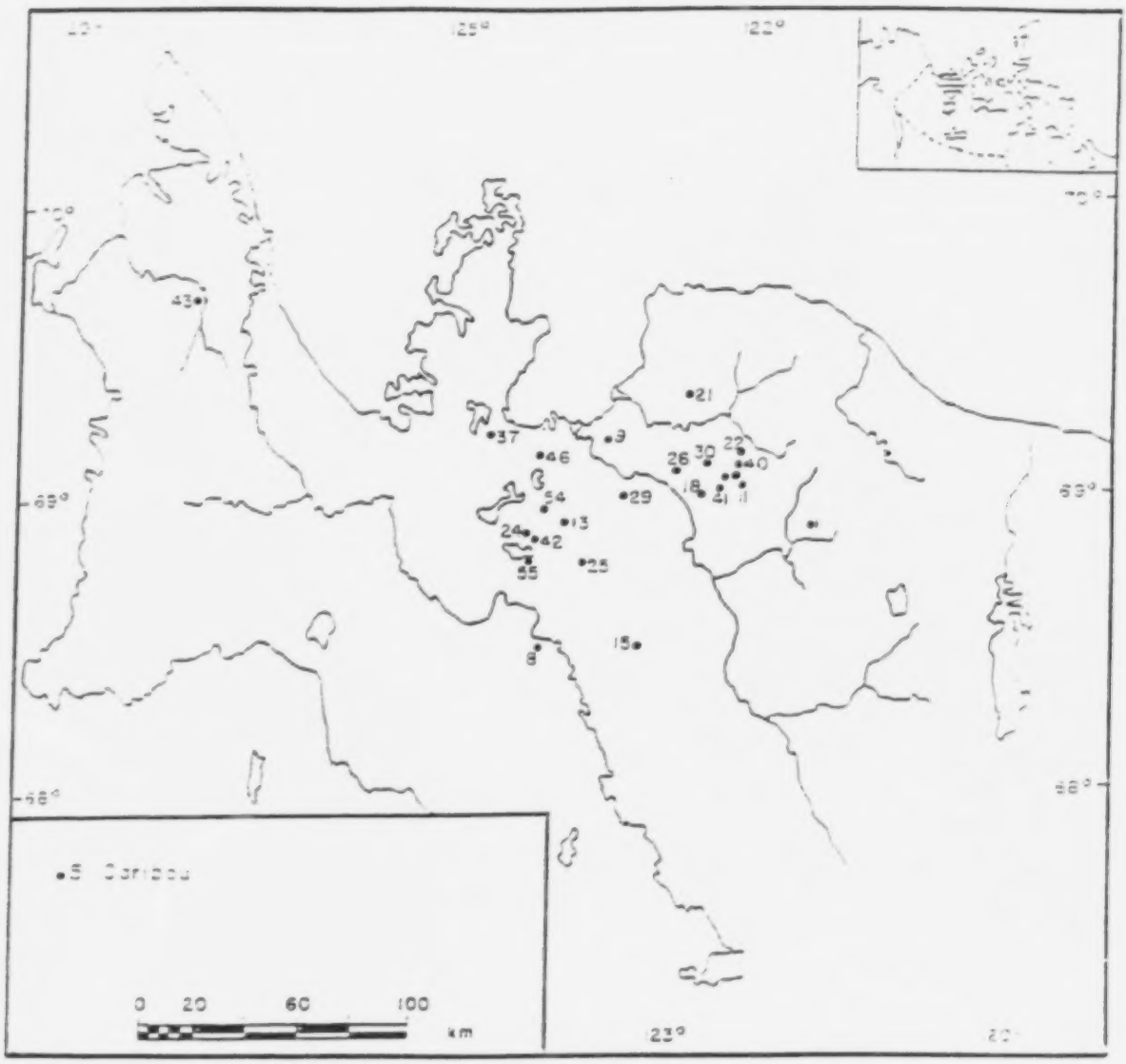

Figure 6. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT, 6-8 June 1987.

Table 1. Distances between locations of radio-collared Bluenose female caribou located in successive years on their calving ground near Paulatuk, NWT.

	DISTANCE (KM) IN SUCCESSIVE YEARS			
ANIMAL #	1986-1987	1987-1988	1986-1988	Total
1	35.5	----	----	
8	----	141.5	----	
9	38.5	----	----	
10	----	----	25.5	
11	18.0	17.0	9.5	
12	----	----	12.5	
13	23.0	----	----	
14	50.0	----	----	
15	95.0	90.0	39.0	
17	19.5	55.0	72.5	
18	11.5	14.0	21.0	
21	52.0	----	----	
22	45.0	27.5	51.5	
24	53.5	----	----	
25	----	14.5	----	
26	19.5	----	----	
29	72.0	17.0	57.0	
30	30.5	----	----	
37	----	107.0	----	
40	33.0	----	----	
41	----	70.5	----	
Smpl sz. (N)	15	10	8	33
Avg. Dist. km	39.8	55.4	36.1	43.6
Std. Dev. km	±21.7	±43.1	±21.2	±30.8

calving location if its location differed by 90 km between years. Using 90 km as measure of fidelity, one adult was unfaithful to its 1986 location (Table 1).

1988 Survey

Thirty-seven collars (25 females collared in 1985, 5 females collared in 1986, 5 in 1987, 2 females collared in March 1988) were available for tracking. Radio-collars were placed on 2 adult females located on tundra winter range south of Dismal Lakes in March 1988 because animals that winter in the Dismal Lakes area are still considered to be part of the Bluenose herd (Carruthers and Jakimchuk 1981).

The survey was completed in 4 days (June 9-12) and 31.1 hours of flying time expended were from departure until return to Inuvik. Snow cover was less than 5%, with snow primarily occurring in low-lying drainages. All of the major lakes were ice-covered while rivers were ice-free. Ninety-two percent (35/38) of the available radiocollars were heard; accurate and visual relocations were obtained for 10 and 11 animals, respectively. Animals not found included 1 female present on the calving ground in 1986 and 1987 and 2 females collared as yearlings in 1987.

Distribution on the Calving Ground

Twenty-four percent of the 21 females were located between the Horton and Hornaday rivers, 38% were between the Hornaday and Brock

rivers, and 14% were between the Brock and Roscoe rivers. The remaining 24% were located outside the main calving area (Fig. 7).

Ten females accurately or visually located in 1987 were accurately or visually relocated in 1988 allowing for a comparison of distance between locations in successive years. The average distance was 55.4 ± 43.1 km (range: 14.0-141.5 km; Table 1). Relocations of 3 females differed by 90 km or more from their 1987 location and they were considered to be unfaithful (Table 1).

Eight females accurately or visually located in 1986 were accurately or visually relocated in 1988 allowing for a comparison of distance between locations in 1986 and 1988. The average distance was 36.1 ± 21.2 km (range 9.5-72.5 km; Table 1).

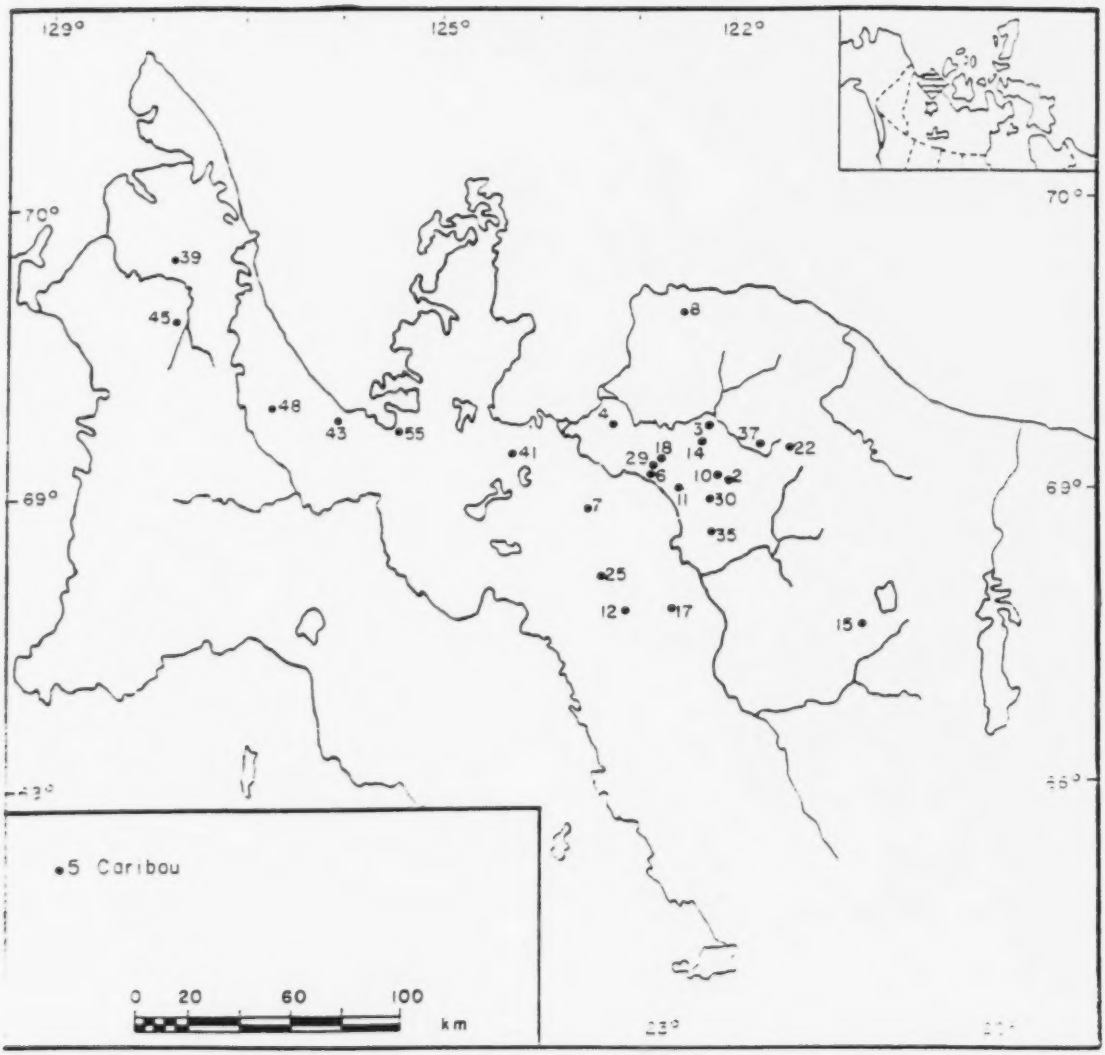

Figure 7. Locations of radio-collared female Bluenose caribou on the calving ground near Paulatuk, NWT, 9-12 June 1988.

DISCUSSION AND CONCLUSION

Female Bluenose caribou were present on their traditional calving grounds during early June. For the three survey years, the majority of the collared females (89%) were located in the central part of the calving ground: 30% were located between the Horton and Hornaday rivers, 39% between the Hornaday and Brock rivers, 20% between the Brock and Roscoe rivers. The remaining 11% were located to the west on the Bathurst Peninsula or to the south. Females with calves were observed on the Bathurst Peninsula both in this study and during earlier surveys (Hawley et al. 1976, Brackett et al. 1982, Latour and Heard 1985, Latour et al. 1986).

Two females were never found on the calving ground while 9 females were not relocated in 1 of 3 years. Locations of 4 females differed by 90 km or more from their locations during previous calving ground surveys and were considered to be unfaithful to their location within the calving ground. Data on the actual calving dates is lacking and relocations may not be exactly where calving occurred. Movements by cows a few days pre- and post-calving would decrease the resolution of the between-year comparison of locations on the calving ground.

Calving grounds within the Northwest Territories are not readily identified by physiographic or vegetative characteristics (Fleck and Gunn 1982). Use of these areas is suspected to be in response to learned or "traditional" behavior (Fleck and Gunn 1982, Gunn and Miller 1986). Studies of the calving distributions of the Porcupine caribou herd in Alaska and the Yukon (Garner and Reynolds 1986) and the Beverly Kaminuriak caribou populations in the NWT

(Fleck and Gunn 1982) have shown that considerable annual variation exists in the area used and movement patterns of pre- and post-calving aggregations. Annual variations in specific locality and concentrations within the calving grounds is thought to be the result of various factors (i.e., snow cover, the presence or absence of predators). Varying snow cover may affect spring migration and influence distribution of female caribou on the calving grounds (Carruthers and Jakimchuk 1981, Latour and Heard 1985, Latour et al. 1986). Within the study area, wolves appear to be uncommon with only single wolves being observed on the calving ground in 1978, 1981, and 1988 (Brackett et al. 1982, Latour and Heard 1985, this study). However, the number of grizzly bears observed on or near the calving grounds varied from 1-27 bears in 5 different years (Brackett et al. 1982, Latour and Heard 1985, Latour et al. 1986). Grizzly bears have been observed preying on caribou calves during the 1988 Beverly calving ground survey (B. McLean, pers. observation). Predation was found to be a factor in the distribution of calving caribou in the Eastern Arctic (Bergerud 1971, 1974; Bergerud et al. 1984; Miller et al. 1988).

RECOMMENDATION

Future work could include greater effort in monitoring the movements of that segment of the Bluenose herd which winters in the Coppermine/Dismal Lakes area. It is unknown if this is their traditional wintering area of if they mix with the rest of the herd and winter farther west in some years. There is also some potential overlap on the winter range of the Bathurst caribou herd (Decker 1976).

ACKNOWLEDGEMENTS

Funding for radio-collars and tracking flights was provided by the Northern Oil and Gas Action Program (NOGAP) in 1986 and 1987. Funding for wildlife research in 1988 was provided under the terms of the Inuvialuit Final Agreement. We wish to thank Winston Fillatre, Wildlife Officer, Inuvik and Jill Pangman for their assistance as observers in 1986 and 1987, respectively. Ilme Liepins, Wolf/Grizzly Bear Technician, Inuvik, assisted during the 1988 survey, both in logistics and as a very capable radio-tracker and observer. Pilot Cecil Rilling (Antler Aviation) provided safe and diligent flying service in 1986 and 1987 while this same quality of flying service was provided by pilots Tom Leeman and Ken Williams (Aklak Air) in 1988.

LITERATURE CITED

Bergerud, A.T. 1971. The population dynamics of Newfoundland caribou. Wildlife Monograph 25: 1-55.

Bergerud, A.T. 1974. The role of the environment in the aggregation, movement and disturbance behaviour of caribou. Pages 552-584 in Geist, V. and Walter, F. (eds.) The behaviour of ungulates and its relation to management. IUCN Publ. New Series No. 24, Morges, Switzerland.

Bergerud, A.T., H.E. Butler, and D. Miller. 1984. Antipredator tactics of calving caribou: dispersion in mountains. Can. J. Zool. 62: 1566-1575.

Brackett, D., W. Spencer, and E. Hall. 1982. Bluenose caribou surveys, 1978-1979. NWT Wildlife Service File Report No. 24 22pp.

Brown, W.K. and J.B. Theberge. 1985. The calving distribution and calving-area fidelity of a woodland caribou herd in central Labrador. Pages 57-67 in Meredith, T.T. and A.M. Martell (eds.) Proceedings of the Second North American Caribou Workshop, Val Morin, Que., 17-20 October 1984.

Carruthers, D.R. and R.D. Jakimchuk. 1981. The distribution, numbers and movement of caribou and muskoxen north of Great Bear Lake, Northwest Territories. Renewable Resources Consulting Ltd. rep. prepared for Polar Gas Project. 114pp.

Cameron, R.D., K.R. Whitten, and W.T. Smith. 1986. Summer range fidelity of radio-collared caribou in Alaska's Central Arctic Herd. Pages 51-55 in A. Gunn, F.F. Miller and S. Skjenneberg (eds.) Proceedings of the Fourth International Reindeer/Caribou Symposium, 22-25 August 1985, Whitehorse, Yukon.

Decker, R. 1976. Bluenose caribou herd; aerial surveillance of the spring migration, 1976. NWT Fish and Wildlife Service. 27pp.

Ferguson, R.S. 1987. Wildlife areas of special interest to the Department of Renewable Resources. NWT Dept. of Renewable Resources. 207pp.

Fleck, E.S. and A. Gunn. 1982. Characteristics of three barren-ground caribou calving grounds in the Northwest Territories. NWT Dept. of Renewable Resources Prog. Report No. 7 158pp.

Garner, G.W. and P.E. Reynolds (eds). 1986. Final report baseline study of the fish, wildlife, and their habitats. U.S. Dept. of the Interior, U.S. Fish and Wildlife Service, Anchorage, Alaska 695pp.

Gunn, A. and F.L. Miller. 1986. Traditional behaviour and fidelity to caribou calving grounds by barren-ground caribou. Pages 151-158 in Gunn, A., F.L. Miller and S. Skjenneberg (eds.) Proceedings of the Fourth International Reindeer/Caribou Symposium, Whitehorse.

Hawley, V., D. Poll, and R. Brown. 1976. Status of the Bluenose caribou herd. Canadian Wildlife Service preliminary progress report 55pp.

Heard, D.C. and G.B. Stenhouse. 1988. Herd identity and calving ground fidelity of caribou in the Keewatin District of the Northwest Territories. NWT Dept. of Renewable Resources ms report 40pp.

Jacobson, R. 1979. Wildlife and wildlife habitat in the Great Slave and Great Bear Lake regions 1974-1977. Environmental Studies No. 10, Dept. of Indian Affairs and Northern Development. 134pp.

Latour, P. and D. Heard. 1985. A population estimate for the Bluenose caribou herd n 1981. NWT Wildlife Service File Report No. 56 25pp.

Latour, P., M. Williams, and D. Heard. 1986. A calving ground and population estimate for the Bluenose caribou herd in 1983. NWT Dept. of Renewable Resources File Report No. 61 23pp.

Miller, F.L., E. Broughton, and A. Gunn. 1988. Mortality of migratory barren-ground caribou on the calving grounds of the Beverly herd, Northwest Territories, 1981-83. Can. Wildl. Serv. Occas. Paper No. 66 24pp.

Skoog, R.O. 1968. Ecology of caribou (Rangifer tarandus granti) in Alaska. Ph.D. thesis, University of California, Berkley. 699pp.

Thomas, D.C. 1969. Population estimates and distribution of barren-ground caribou in Mackenzie District, N.W.T., Saskatchewan, and Alberta - March to May, 1967. Can. Wildl. Serv. Report Series No. 9 44pp.

Zoltai, S.C., D.J. Karasiuk, and G.W. Scotter. 1979. A natural resource survey of Horton-Anderson rivers area, Northwest Territories. Parks Canada unpubl. report. 160pp.